Cleanup Guidelines for Properties Quarantined Due to Clandestine Drug Laboratory Activities

Introduction

This document is designed to assist property owners on the appropriate steps necessary to remove a Louisville Metro Health Department quarantine order due to presence of hazardous substances and/or waste associated with the criminal production of methamphetamine, other clandestine drugs, and the precursors.

The primary goals of a cleanup response:

- Achieve a level of cleanliness that is protective of human health so a property can be deemed “Safe for Human Use”.
- Document the cleanup response.

In order to achieve these goals, it is important for both the property owner and/or Cleanup Contractor to understand all residual health hazards posed as a result of this criminal activity. In addition, the Cleanup Contractors must be able to accurately assess the hazards, identify the appropriate cleanup procedures, and adequately document the cleanup response

Contaminants of Methamphetamine Production

Residual methamphetamine and associated hazardous waste are released during the drug ‘cooking’ process. Airborne contaminants are absorbed into rugs, furniture, drapes, walls and other absorbing surfaces. Airborne contaminants also enter and contaminate the heating, ventilation, and air conditioning (HVAC) system. Spills are common and impact floors, walls, appliances, and other surfaces. Hazardous wastes may be dumped into sinks, toilets, and bathtubs, resulting in contamination of the waste water system. During a methamphetamine cooking process, levels of iodine, phosphine, and hydrochloric acid are likely to exceed current occupational standards using the red phosphorous method. Hydrochloric acid levels were especially high during the final "acidification stage," often exceeding the NIOSH level of IDLH (Immediately Dangerous to Life and Health). Large amounts of methamphetamine are also released into the air and deposited on horizontal and vertical surfaces throughout the building. ‘Cooking’ can release as much as 5,500 micrograms of methamphetamine per cubic meter into the air, and deposit as much as 16,000 micrograms per 100 square centimeters onto surfaces. Both residual methamphetamine and the hazardous wastes generated during the manufacturing process pose a threat to human health, and render the property ‘Unsafe for Human Use’. Contaminants resulting from the manufacturing process may be in the form of corrosive waste sludge and /or as residues of a variety of volatile organic compounds (VOCs), metals, acids and bases. Some of the chemicals used in the process include but are not limited to hydriodic acid, hydrochloric acid, sulfuric acid, sodium hydroxide, red phosphorus, hydrogen peroxide, naphtha,

charcoal lighter fluid, Freon, chloroform, acetone, benzene, toluene, ethyl ether, acetic acid, methyl-ethyl-ketone, hypophosphorus acid, yellow phosphorus, anhydrous ammonia, lithium, sodium, isopropyl alcohol, ethyl alcohol, and methanol. The residual contaminants may be contained in or on absorbent materials, ceiling tiles, walls, floors, counter-tops, appliances, children toys, linen, drapes, furniture, mattresses, clothing, soil, waste water systems, HVAC systems, range vent hoods, etc.

After adequate ventilation of contaminated areas, most solvent vapors will not pose an immediate threat to human health. Solvents tend to evaporate easily and dissipate when ventilated. For most of these solvents a substantial spill or continuing source is necessary to maintain a toxic concentration over a long period of time. Similarly, phosphine gas, a highly toxic byproduct, is a concern during and shortly after the actual 'cook'. However, since it is so reactive and dissipates rapidly it is not likely to have a long residence time when the structure ventilated adequately.

Spills are very common in methamphetamine labs. Solvents, ammonia, red phosphorous, iodine and other chemicals can leave hazardous vapors or residues on either hard or porous surfaces. Those on porous surfaces can have considerable residence times. Like residues from vapors, the residues from spills can be tracked from place to place on shoes, clothing, toys, and other items of people present during cooking or cleanup. Spills may also be a persistent source of volatile chemicals. Spill areas should be targeted for removal or thorough cleaning.

The primary route of disposal for contaminants is the waste water system. Sinks and toilets provide a route of disposal for the large amounts of byproducts (hazardous waste sludge) that result from drug production. The sludge in turn frequently clogs p-traps and toilets making the waste water system inoperable, and possibly contaminating the septic field depending on degree of drug production. Fortunately, many of the microorganisms in a septic system can break down the hazardous chemicals. If the amount of drug production is great or the lab has been operating for an extended period of time, extreme pH conditions or large amounts of solvent may overwhelm the system, which will require it to be remediated by informed professionals. Municipal sewer systems can take these byproducts miles from the clandestine lab. Fortunately, this transport action within a municipal sewer system has a tendency to dilute the problem, so for many cases a simple notice of the problem to the sewer authority may be a sufficient remedial action.

Another key transport mechanism in methamphetamine labs is the heating, ventilation and cooling (HVAC) system. Intakes from the HVAC or other air duct systems can pull in hazardous vapors and redistribute them to every room attached to the system. Residues can accumulate in ductwork, filter and blower mechanism (typically at low temperature and low air movement) and then off-gas later (typically at high temperature and high movement). Depending on Tiered response, a cleaning of the ductwork and blowers is appropriate, and filter replacement should be considered during a methamphetamine lab remediation.

Below are examples of chemicals that may be encountered, the transport mechanisms, location of contaminants, and its persistence on the quarantined property.

- **Anhydrous Ammonia** - tends to evaporate - does not tend to leave a residue - easily removed by ventilation
- **Phosphine gas** - always in gaseous form - reacts with other chemicals in the environment and degrades rapidly - dissipates with ventilation

- **Methamphetamine** - vaporizes during production and deposits as residue - resides as residue on surfaces - may be persistent on surfaces
- **Acids** - released as vapor during production or as a spill - deposited as residue - reside on surfaces until wetted - long residence time
- **Solvents** - released as vapor during production or spilled - absorb into porous surfaces and evaporate over time - persistence is related to spill volume, the extent of perfusion into porous materials, and environmental conditions
- **Red Phosphorous** - released as spill - resides as residue - indefinitely
- **Iodine** - released as spill - resides as residue - indefinitely
- **Lead** - released as vapor or as spill - resides as residue or dust - infinite residence
- **Mercury** - released as vapor or as spill - resides as metallic residue or as a gas indefinite residence time.
- **Lithium** - released as spill or battery pieces - resides in spill residue or metallic chunks, infinite residence
- **Alkalis (Lye)** -released as spill, resides as residue or dried spill, indefinite residence
- **Alcohols (methanol)** - released as spill - absorb into porous surfaces and evaporate over time - persistence is related to spill volume, the extent of perfusion into porous materials, and environmental conditions

Standards of Cleanliness

Standards of cleanliness for sites used to manufacture methamphetamine:

- Methamphetamine: Shall not exceed 0.1 micrograms /100 square centimeters
- Volatile Organic Chemicals (VOC): Shall not exceed 1 part per million (ppm) total hydrocarbons and VOCs in air under normal inhabitable ventilation conditions.
- Mercury*: Shall not exceed 1.0 ug/m3 of air under normal inhabitable ventilation conditions.
- Lead*: Shall not exceed 40 micro grams per square foot

** When it is determined that the Amalgam (P2P) process was not used these standards do not apply*.

It is believed that the cleanup procedures necessary to decrease the levels of methamphetamine to 0.1 micrograms /100 square centimeters **should be adequate to reduce the concentrations of other methamphetamine-related chemicals to acceptable levels.**

Analytical Methodology

The current EPA SW-846 analytical methods used to detect methamphetamine is 8270C-Modified, for lead the method is 6020, and for mercury the method is 7471A. The Louisville Metro Health Department recognizes that science and technology are constantly refining analytical procedures and instrumentation. Therefore, any proven and defensible analytical methodology / technology that has a detection level lower than the ‘Standards of Cleanliness’ numbers can be employed. These alternate analytical methods must be thoroughly documented to ensure that data results are defensible. A photoionization detector (PID) can be used for VOC determinations. The correct lamps must be used and the instrument calibrated prior to screening of the VOC. The calibration of the instrumented must be documented. Normal visual acuity can

be used for determining if items are stained or discolored. Litmus paper can be used to ascertain if acid / caustic residues are present.

Sampling Strategy and Methodology

It is much more cost effective for the property owner and the Cleanup Contractor to make the assumption that contamination is present when a 'methamphetamine cook' has occurred, than it is to spend money to prove contamination is not via presampling determinations. With the exception of screening samples (e.g. - VOCs in air, staining and pH of various surfaces), sample collection should be performed after the cleanup action is completed. This type of sampling is called confirmatory. It confirms that the cleanup response addressed all contamination sources. When a Tiered Response cleanup action is implemented correctly, all contaminated surfaces should be removed, washed, and or sealed to prevent risk of exposure.
Confirmatory air samples must be acquired under normal HVAC operations from locations that exhibited the highest screening detections. Surface samples must be taken from surface areas that were not replaced and must target areas that exhibited the highest screening values or visual contamination noted during the inspection. The number of confirmatory samples to determine compliance is left to the 'Best Professional Judgment' of the Health Department.

Recommended Methamphetamine Cleanup Resources

The following URLs are provided as additional resources.
KCI, The Anti-Meth Site
http://www.kci.org/meth_info/links.htm
Washington State Department of Health
http://www.doh.wa.gov/ehp/ts/cdl.htm
Colorado Department of Health and Environment
http://www.cdphe.state.co.us/hm/methlab.pdf
http://www.cdphe.state.co.us/hm/methlabfactsheet.pdf
Minnesota Department of Health
http://www.health.state.mn.us/divs/eh/meth/lab/labcleanup.html

Tiered Response Scenarios for Cleanups

In surveying the types of crime scenes encountered by law enforcement, the degree of methamphetamine production directly influences the degree of potential contamination that may be encountered at one of these quarantined properties. In turn, the degree of potential contamination will directly impact the amount of sampling, removals, and cleanup procedures necessary to return the property to its appropriate reuse, thus releasing the property from quarantine. The following tiered response scenarios provide examples for reasonable, appropriate and protective cleanups of properties that have been quarantined as a result of the presence and or potential release of hazardous substances used in the criminal production of methamphetamine. The Louisville Metro Health Department will designate the tier response necessary and provide detail, site specific cleanup instructions to the responsible party. Prior to any cleanup action the following activities must have occurred:

- All criminal investigations of the Crime Scene are completed and permission to enter property from the designated Chief Law Enforcement Officer has been secured.

- All lab process related chemicals, waste, and paraphernalia have been removed and documented by law enforcement and their response contractors. The initial assessment and inspection of the quarantined property by the Health Department.

Tier 1 Response (designated by the Health Department)

An example of when a Tier 1 scenario is appropriate is when the crime scene evidence and site inspection and assessment indicate that no production of methamphetamine or its precursors have occurred, and no stains or significant spills are noted. Precursors may be present in large quantities and may have been transferred out of original containers. Remember that the base assumption is the release of contaminants is very minimal. Even though contamination may not be clearly visible, a cleanup response is needed and it needs to be documented. There is a potential that the drug may have been used on the premises.

Since contact with hazardous materials or substances is minimal or not anticipated for a Tier 1 Cleanup Response, HAZWOPER (OSHA 1910.120) certification for cleanup workers may not be necessary. This is will be determined by the Health Department.

The minimum cleanup requirement includes the following:

- Document and photograph the cleanup action.
- Remove all ancillary volatile and semi-volatile chemical sources that may be located on the premise associated with the lab process, then heat and ventilate premise for 72 hours prior to cleanup. *(Examples of VOC sources include: automotive gas, propane, automotive cleaners, aerosols, dry cleaned clothing, etc. If this task is not performed, then false positive for VOC air samples may occur.)*
- If a minor spill is noted during the assessment, target that area for an appropriate and thorough cleaning, wearing appropriate personal protective equipment.
- Using appropriate PPE, the cleanup workers shall thoroughly clean all hard surfaces with appropriate cleansers; including but not limited to floors and countertops.
- Shampoo rugs, steam clean mattress and cloth furniture, and launder bed linens and drapes.
- Secure cleaning receipts for documentation purposes.
- Have cleanup workers sign off on cleanup checklist that work was performed.
- Launder or dispose any clothing or items left behind by the clandestine lab operator or their family and discard them.
- Thoroughly clean all children toys with nonporous surfaces, such as rubber and plastic.
- Dispose of all children's toys with cloth and other porous surfaces such as stuffed animals.

Tier 2 Response (designated by the Health Department)

An example of when this scenario is appropriate is when the crime scene evidence and site inspection indicate that production of methamphetamine or its precursors have occurred to a limited degree, and / or moderate staining and or spills of hazardous substances were noted. The minimum cleanup requirement includes all steps in Tier 1 Response in addition to the following:

- Wash and clean all appliances thoroughly.

- After cleanup is accomplished, ventilate property for 72 hours. If appropriate, use litmus paper to target areas of potential concern.
- Alternatively heat and ventilate property for a minimum of 8 days. Remember to remove all potential VOC sources on the property.
- If appliances and fixtures are stained and contaminated to the point that successful cleaning is in doubt, then render appliances and fixtures unserviceable and remove.
- Absorbent surfaces (e.g. drop ceilings surrounding and proximal to 'cook', mattresses, pillows, carpets, and clothing) shall be rendered unserviceable and removed.
- All potential process related stained surfaces and items shall be rendered unserviceable and removed.
- Where appropriate, the removed items are to be documented and manifested to Special Waste landfill facilities.
- All non-stained hard surfaced are to be washed with appropriate cleaners.
- Where appropriate, all washed hard surfaces are to be painted or sealed.
- All other absorbent surfaces (e.g. – linens, drapes) are to be commercially cleaned.
- Cloth furniture is to be commercially steam cleaned.
- Replace air filters in HVAC
- Commercially clean ventilation duct works.
- Inspection, sampling and removal of hazardous contaminants of the secondary onsite treatment systems.
- Inspection of plumbing fixtures

After completion of cleanup, acquire confirmatory samples to determine if site meets Standard of Cleanliness.

Since risk of contact with hazardous materials or substances is increased for a Tier 2 Cleanup Response, HAZWOPER (OSHA 1910.120) certification for cleanup workers may be necessary. This is will be determined by the Health Department.

Tier 3 Response (designated by the Health Department)

An example of when this scenario is appropriate is when the crime scene evidence and site inspection indicates that production of methamphetamine or its precursors has occurred and were produced over an extended period of time, or gross staining and spills of hazardous substances are noted on interior surfaces, or indoor air quality is affected.

At a minimum a typical cleanup would involve the following:

- Ventilate property for a minimum of 2 week.
- Where applicable, follow all cleaning responses in Tier 1 and 2. (Be advised that contact with residual hazardous substances or waste is possible.)
- Remove all porous and absorbent materials and render unserviceable.
- Remove all stained materials and render unserviceable.
- Remove all impacted appliances and fixtures and render unserviceable.
- All Subsurface construction material must meet Standard of Cleanliness prior to reconstruction, if not remove and render unserviceable.

- Sampling and removal of hazardous contaminants of the secondary onsite treatment systems.
- Inspection and cleaning of plumbing fixtures.
- All surfaces, not replaced, must meet Standard of Cleanliness after cleanup.
- Removed items are to be documented and manifested to Special Waste facilities.
- If hazardous waste is present, then it must be manifested to Hazardous Waste facilities.

Since contact with hazardous materials or substances is anticipated for a Tier 3 Cleanup Response, HAZWOPER (OSHA 1910.120) certification for cleanup workers may be necessary. This is shall be determined by the Health Department.

Tier 4 Response – (designated by the Health Department)

The "mass-production cook"

An example of when this scenario is appropriate is when the crime scene evidence and site inspection indicate that long-term production of methamphetamine or its precursors has occurred, gross staining and contamination of interior and or surfaces are observed, or indoor and / or outdoor air quality are affected, or evidence suggests that numerous spills, releases, disposals and burials of hazardous substances and waste have been or are present on the property that represent a threat to the environment. Other states have referred to these types of sites as Super labs.

Follow all cleaning responses listed in Tier 1, 2 and 3.

Please note that prior to any cleanup response for a Tier 4 scenario, when it is determined that hazardous substances or waste are present in such quantities that a regulatory oversight may be required, coordination with Kentucky Department of Natural Resources for the appropriate oversight of hazardous waste characterization, disposal, and cleanup activities is necessary prior to any cleanup response.

An environmental hazardous materials remediation contractor, approved by the Louisville Metro Health Department, employing HAZWOPER (OSHA 1910.120) certified technicians shall be necessary for a Tier 4 Cleanup response since contact with hazardous materials or substances is anticipated.

How to get started with a clean-up Response:

When should the clean-up response for quarantined properties begin? When the criminal investigation authorities have decided that the crime scene is no longer necessary for evidence collection, and approval to enter the quarantined property has been secured in writing from the designated LMPD Officer by the property owner.

Property owners may be required to contract an environmental hazardous materials remediation contractor with HazWoper OSHA 1910.120 certification.

- The property owner or cleanup contractor will develop an appropriate plan for cleanup activities based on the Tier Response.

- Appropriate PPE for the protection of the cleanup workers will be assigned. This step is very important because it is the cleanup workers that will have the greatest potential to be exposed to contaminants at these properties.
- The property owner or cleanup contractor shall verify and document that all cleanup work was performed according to the plan.
- If removal and disposal of contaminated media requiring Special Waste or Hazardous Waste manifesting is necessary, then this activity must be approved by the appropriate regulatory agency, and documented in a Transportation and Disposal Plan.

Documentation Requirements

After the cleanup response is completed, the property owner or cleanup contractor shall submit a written report along with before-and-after photo documentation of all cleanup activities. In addition, if a removal activity occurred during the cleanup response the Transportation and Disposal Plan must be included.

In addition to the above report and supporting documentation, the Cleanup Contractor, if utilized shall submit a letter certifying that the quarantined property has been cleaned up and that all risks and hazards resulting from criminal methamphetamine production have been abated, and that the property is 'Safe for Human Use'. This letter is to be attached to the front of the document package.

The property owners are to keep a certified copy of this documentation for a minimum of 5 years.

For more information contact:

Connie Mendel
Environmental Health Manager, Louisville Metro Health Department
400 E. Gray St.
Louisville, KY 40202
502-574-6650